202306UECM3463OE4a

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Review of preview

Started on	Tuesday, 5 September 2023, 10:48 PM
Completed on	Tuesday, 5 September 2023, 10:48 PM
Time taken	15 secs
Marks	0/8
Grade	**0** out of a maximum of 10 (**0**%)

1

Marks: 1

You are given the following observed claim frequency data collected over a period of 365 days:

Number of Claims per Day	Observed Number of Days
0	56
1	152
2	121
3	36
4+	0

Fit a Geometric distribution to the above data, using the method of maximum likelihood. Group the data by number of claims per day into four groups:

0	1	2	3 or more

Apply the chi square goodness of fit test to evaluate the null hypothesis that the claims follow a Geometric distribution. Let Q be the value of the chi-square statistic and u be the degrees of freedom. Determine Q-u. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 215.4256
Marks for this submission: 0/1.

2

Marks: 1

You are given the following claim frequency data:

Number of Claims	0	1	2	3	4
Number of risks	7	11	14	16	8

The null hypothesis is that the number of claims per risk follows a uniform distribution on 0, 1, 2, 3, and 4. Let Q be the value of the chi-square statistic and u be the degrees of freedom. Determine Q+u. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 9.25
Marks for this submission: 0/1.

3

Marks: 1

A random sample of 10 claims $x_1, \ldots, x_{10}$ is taken from the probability density function

$$f(x_i) = 1/[\Gamma(\alpha)\theta^{\alpha}]x_i^{\alpha-1}e^{-x_i/\theta},\ x_i > 0.$$

In ascending order the observations are:
19.48, 45.3, 48.32, 56.4, 60.33, 89.43, 120.43, 123.98, 129.93, 278.62
Suppose the parameters are $\alpha = 3$ and $\theta = 51$. Determine the Kolmogrov-Smirnov statistic for the fitted distribution. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 0.4317
Marks for this submission: 0/1.

4 Marks: 1

A random sample of 8 claims x_1, ..., x_8 is taken from the probability density function

$$f(x_i) = (\alpha\,\theta^{\alpha})/(x_i^{\alpha+1}),\ \alpha,\ \theta > 0,\ x_i > \theta.$$

In ascending order the observations are:
127, 129,131, 132, 136, 138, 141, 164
Suppose the parameters are $\alpha = 5$ and $\theta = 127$. Determine the Kolmogrov-Smirnov statistic for the fitted distribution. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 0.4678
Marks for this submission: 0/1.

5 Marks: 1

You observe the following seven losses on a coverage with deductible 500 and maximum covered loss 10000:
634; 802; 1510; 1782; 2218; 3223; 4997.
In addition, you observe two losses above 10000 for which the payments of 9500 were made. You fit these losses to a two parameter Pareto with $\theta = 1000$ and $\alpha = 1$. Calculate the Kolmogorov-Smirnov statistic for the hypothesis. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 0.1802
Marks for this submission: 0/1.

6 Marks: 1

For an insurance coverage with deductible 500, losses below the deductible are not reported. Four observed losses are 700, 1000, 2000 and 4500. You test whether the underlying ground-up loss distribution has probability density function

$$f(x) = 1000e^{-1000/x}/x^2,\ x>0.$$

Calculate the Kolmogorov-Smirnov test statistic. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 0.2311
Marks for this submission: 0/1.

7 Marks: 1

You fit a Pareto distribution to a sample of 290 claim amounts and use the likelihood ratio test to test the hypothesis that $\alpha = 2.6$ and $\theta = 6.5$. You are given:

- The maximum likelihood estimates are $\hat{\alpha} = 2.4$ and $\hat{\theta} = 6.2$.
- $\Sigma \ln(x_i+6.5) = 631.85$
- $\Sigma \ln(x_i+6.2) = 574.99$

Let Q be the value of the likelihood ratio test statistic and u be the degrees of freedom. Determine Q-u. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 308.06
Marks for this submission: 0/1.

8 Marks: 1

You fit a Weibull distribution to a sample of 20 claim amounts. You test H_0: $\tau = 2$ versus H_1: $\tau \neq 2$ using the likelihood ratio statistic. You are given:

- $\Sigma \ln x_i = 73.7333$

- $\sum x_i^2 = 85193$
- At the maximum likelihood estimate, the loglikelihood is -97.778
- The maximum likelihood estimate of θ when $\tau = 2$ is $\hat{\theta} = 65.266$

Determine the likelihood ratio statistic. _____

Answer:

Make comment or override grade

Incorrect
Correct answer: 3.5292

Marks for this submission: 0/1.